

Fig. 1

# UVTech Systems Inc., PhotoChemical Ablation Model

| Case Definition                                   | Gas Parameters  | Material Parameters  | Chemical                            |
|---|---|--|-------------------------------------|
| Removed Material<br>AZ 2400 Photo Resist          | Reactive Gases  | Material<br>Absorption Coefficient<br>(micron <sup>-1</sup> )  | Photo-chemical parameter 1<br>0.002 |
| Reactive Gases<br>Ozone + Oxygen                  | Starting Partial Pressure (Torr)<br>0   | Material Threshold (mJ/cm <sup>2</sup> )<br>30                 | Photo-chemical parameter 2<br>0.02  |
| Laser Wavelength (nm)<br>193<br>248<br>266<br>355 | Molecular Cross Section (x 10 <sup>-20</sup> cm <sup>2</sup> )<br>67.50<br>810.00<br>762.75<br>0.07 | Material Refractive Index<br>2.10<br>1.90<br>1.86<br>1.74      |                                     |
|   | Partial Pressure Increment (Torr)<br>0  | Angle of Incidence (Degrees)<br>0.1                            |                                     |
|   | Gas 1 (Ozone)<br>499  | Reflectivity Amplitude (s & p)<br>-0.31<br>-0.30<br>-0.27      |                                     |
|   | Gas 2 (Oxygen)<br>499   | Reflectivity Component (s & p)<br>0.13<br>0.10<br>0.09<br>0.07 |                                     |
|   | other<br>0  | Total Reflectivity<br>0.13<br>0.10<br>0.09<br>0.07             |                                     |
| Pulse Fluence                                     | Total Pressure<br>500   |  |                                     |
| Base Fluence Value (mJ/cm <sup>2</sup> )<br>1     | Optical Path Through Gas (cm)<br>3  |  |                                     |
| Fluence Increment (mJ/cm <sup>2</sup> )<br>30     |   |  |                                     |

**Spectral Dependencies**

Legend:   
☐ Material Absorption  
☒ Gas Absorption

| Wavelength (nm) | Material Absorption (Arbitrary Units) | Gas Absorption (Arbitrary Units) |
|-----------------|---------------------------------------|----------------------------------|
| 193             | ~15                                   | ~1                               |
| 248             | ~12                                   | ~1                               |
| 266             | ~10                                   | ~1                               |
| 355             | ~5                                    | ~1                               |

1516.2

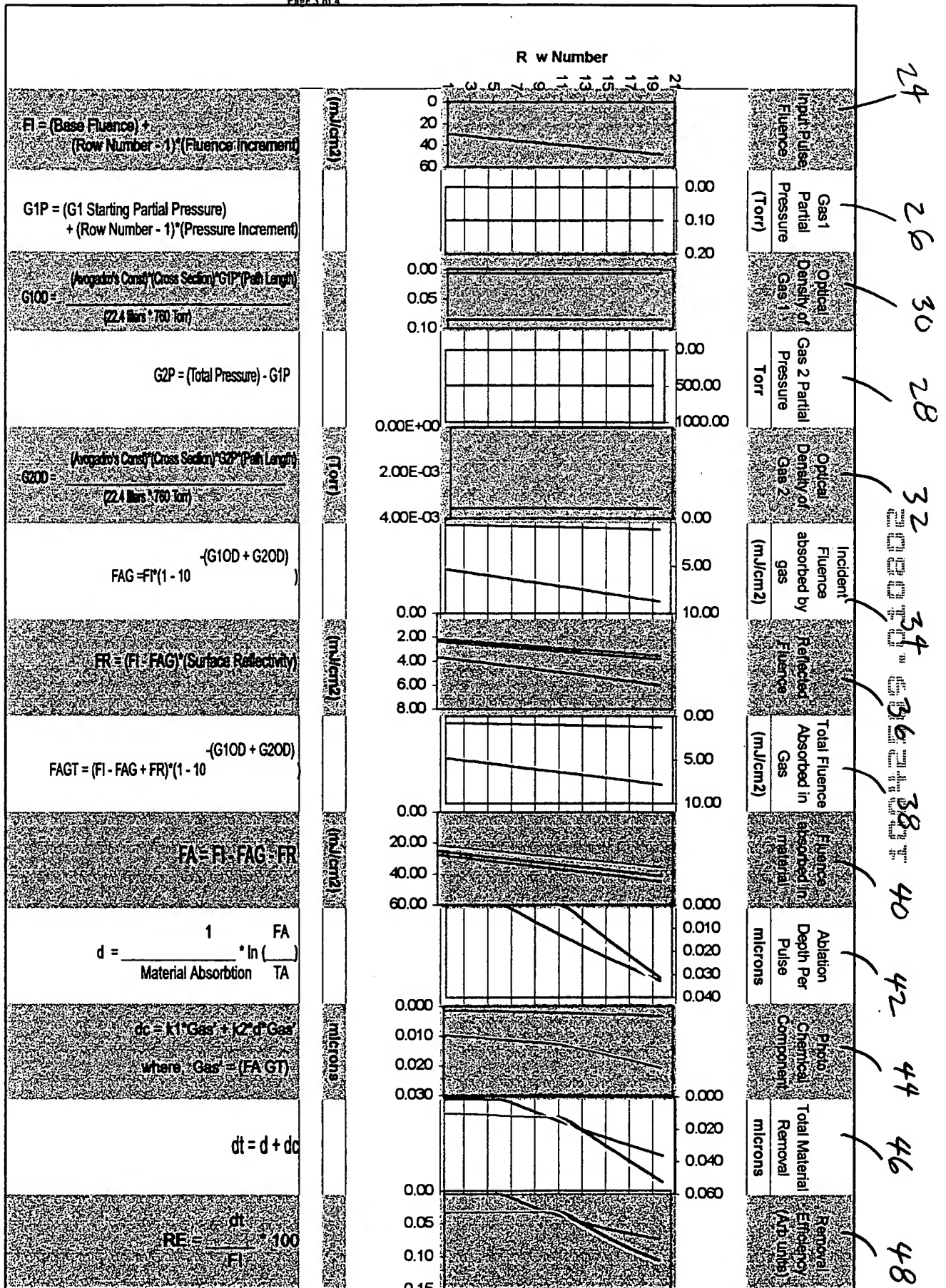


FIG. 3

| 193 nm     |                       |        |                        |        |                        |        |                                  |                       |                               |
|------------|-----------------------|--------|------------------------|--------|------------------------|--------|----------------------------------|-----------------------|-------------------------------|
| Row Number | (mJ/cm <sup>2</sup> ) | (Torr) | Gas 1 Partial Pressure | (Torr) | Gas 2 Partial Pressure | (Torr) | Incident Fluence absorbed by gas | (mJ/cm <sup>2</sup> ) | Total Fluence Absorbed in Gas |
| 20         | 54                    | 1.00   | 0.07                   | 499.00 | 0.00576226             | 90.78  | 85.99                            | 0.439                 | 1.367                         |
| 19         | 54                    | 1.00   | 0.07                   | 499.00 | 0.00576226             | 86.01  | 81.47                            | 0.434                 | 1.304                         |
| 18         | 54                    | 1.00   | 0.07                   | 499.00 | 0.00576226             | 81.24  | 76.95                            | 0.428                 | 1.241                         |
| 17         | 49                    | 1.00   | 0.07                   | 499.00 | 0.00576226             | 76.47  | 72.44                            | 0.422                 | 1.178                         |
| 16         | 45                    | 1.00   | 0.07                   | 499.00 | 0.00576226             | 71.70  | 67.92                            | 0.416                 | 1.116                         |
| 15         | 42                    | 1.00   | 0.07                   | 499.00 | 0.00576226             | 66.93  | 63.40                            | 0.409                 | 1.054                         |
| 14         | 39                    | 1.00   | 0.07                   | 499.00 | 0.00576226             | 62.16  | 58.88                            | 0.401                 | 0.992                         |
| 13         | 37                    | 1.00   | 0.07                   | 499.00 | 0.00576226             | 57.39  | 54.36                            | 0.393                 | 0.930                         |
| 12         | 35                    | 1.00   | 0.07                   | 499.00 | 0.00576226             | 52.62  | 49.85                            | 0.385                 | 0.868                         |
| 11         | 31                    | 1.00   | 0.07                   | 499.00 | 0.00576226             | 47.85  | 45.33                            | 0.375                 | 0.806                         |
| 10         | 27                    | 1.00   | 0.07                   | 499.00 | 0.00576226             | 43.08  | 40.81                            | 0.365                 | 0.744                         |
| 9          | 24                    | 1.00   | 0.07                   | 499.00 | 0.00576226             | 38.31  | 36.29                            | 0.353                 | 0.682                         |
| 8          | 21                    | 1.00   | 0.07                   | 499.00 | 0.00576226             | 33.55  | 31.78                            | 0.340                 | 0.619                         |
| 7          | 18                    | 1.00   | 0.07                   | 499.00 | 0.00576226             | 28.78  | 27.26                            | 0.324                 | 0.556                         |
| 6          | 15                    | 1.00   | 0.07                   | 499.00 | 0.00576226             | 24.01  | 22.74                            | 0.306                 | 0.491                         |
| 5          | 12                    | 1.00   | 0.07                   | 499.00 | 0.00576226             | 19.24  | 18.22                            | 0.284                 | 0.424                         |
| 4          | 9                     | 1.00   | 0.07                   | 499.00 | 0.00576226             | 14.47  | 13.70                            | 0.256                 | 0.353                         |
| 3          | 6                     | 1.00   | 0.07                   | 499.00 | 0.00576226             | 9.70   | 9.19                             | 0.216                 | 0.274                         |
| 2          | 3                     | 1.00   | 0.07                   | 499.00 | 0.00576226             | 4.93   | 4.67                             | 0.148                 | 0.171                         |
| 1          | 1                     | 1.00   | 0.07                   | 499.00 | 0.00576226             | 0.16   | 0.15                             | 0.000                 | 0.000                         |

Fig. 4